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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/615,398	07/13/2000	Andrew C. Gallagher	80839DMW	3800

1333 7590 07/09/2004  
PATENT LEGAL STAFF  
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EXAMINER

GENCO, BRIAN C

ART UNIT PAPER NUMBER

2615

DATE MAILED: 07/09/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/615,398

Applicant(s)

GALLAGHER ET AL.

Examiner

Brian C Genco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10, 12-20, 22-47 and 49-57 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-6, 10, 12-20, 22, 25, 33, 36-38, 42-46, 55 and 56 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 7-9, 23, 24, 26-32, 34, 35, 39, 40, 49, 50, 52, 53 and 57 is/are rejected.
- 7) ☒ Claim(s) 41, 47, 51 and 54 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____.  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____.  | 6) <input type="checkbox"/> Other: ____.                                    |

Applicant's amendment filed May 7, 2004 has been fully considered by the Examiner.

Applicant's arguments are moot in view of new grounds of rejection presented herein bellow.

***Allowable Subject Matter***

Claims 3-6, 12-20, 22, 25, 33, 36-38, 42-45, and 46 are deemed allowable over the prior art of record, see the reasons for allowance in Paper No. 6.

Note that claims 4-6 and 46 depend from claim 3.

Claims 10, 26-32, 34, 55, and 56 are deemed allowable over the prior art of record, the reasons for allowance is as follows:

In regards to claim 10 see Examiners reasons for allowance for claim 33 in Paper No. 6.

In regards to claim 26 the prior art of record does not disclose nor fairly suggest the particular pattern claimed in claim 26 and depicted in Fig. 3A of the instant invention.

Claims 27-32, and 34 depend from claim 26.

In regards to claims 55 and 56 the reasons for allowance are substantially similar to the reasons for allowance of claim 42 in Paper No. 6.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Claims 41, 47, 51, and 54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In regards to claim 41 note that similar to the reasons for allowance of claim 12 in Paper No. 6, Nayar does not disclose the particular pattern claimed in claim 41.

In regards to claim 47 the prior art of record does not disclose nor fairly suggest the particular pattern of standard and non-standard photosites claimed in claim 47.

In regards to claims 51 and 54 the prior art of record does not disclose nor fairly suggest the image capture system or method of claims 1 and 23 respectively wherein the mode is set as a function of dynamic range of said image signal.

***Claim Rejections - 35 USC § 102***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 35 is rejected under 35 U.S.C. 102(b) as being anticipated by (USPN 5,714,753 to Park).

In regards to claim 35 Park discloses an image sensor for generating an image signal with a different response to image light, said image sensor comprising:

an array of photosites divided into standard photosites (e.g., element 22 of Fig. 3) and a non-standard photosites (e.g., element 24 of Fig. 3)

a structural element overlying the photosites and providing the standard photosites with a predetermined standard response to a light exposure and the non-standard photosites with a slower response to the same light exposure;

wherein the structural element comprises an array of lenslets overlying the standard photosites, and the non-standard photosites are not overlaid with lenslets (e.g., column 2, lines 54-57).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, 7-9, 23, 24, 39, 49, 50, 52, 53, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over (“High Dynamic Range Imaging: Spatially Varying Pixel Exposures” by Shree K. Nayar and Tomoo Mitsunaga. Proceedings IEEE Conference on Computer Vision and Pattern Recognition, Vol. I, pp. 472-479) in view of (USPN 5,838,373 to Hasegawa et al.).

In regards to claim 1 Nayar discloses an image capture system for generating an extended effective dynamic range from a signal provided by an image sensor, said image capture system comprising:

an image sensing device having standard photosites (e.g., photosite e3 depicted in Fig. 1, note the first paragraph of section 3 on page 473) with a predetermined response to a light

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exposure and a non-standard photosites (e.g., any one of elements e0-e2 of Fig. 1, in particular element e1) with a slower response to the same light exposure;

an optical section for exposing the image sensing device to image light, thereby causing the image sensing device to generate an image signal (e.g., the claimed optical section is inherent with a camera); and

a processing section for expanding the response of the standard photosites to increased light exposures by utilizing the image signals from neighboring non-standard photosites (e.g., see section 6).

Nayar does not explicitly disclose nor preclude an additional section receiving said image signal or a controller having a normal mode and an expanding mode, said controller in said normal mode diverting said signal directly to said additional section, said controller in said expanding mode diverting said image signal through said processing section to said additional section.

Examiner notes that Nayar's invention discloses providing an optical mask and the claimed processing section in conjunction with a conventional image detector array as described in the abstract. Examiner notes that an additional section such as conventional image processors including conventional functions such as gamma correction, edge enhancement, color demosaicing, etc., is implicit in conjunction with any conventional image detector array.

Examiner notes that in section 6 Nayar discloses that "a reduction in resolution results from the fact that some of the pixels with high exposures are expected to be saturated and some of the ones with very low exposure are expected to produce low and noisy intensities."

Hasegawa discloses that in the prior art in performing dynamic range enhancement, resolution is

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sacrifice, and in keeping resolution dynamic range is sacrificed (column 2, lines 4-8). Hasegawa discloses a mode selection for a high dynamic range output or a high resolution output, thereby enabling a user to easily select one of the two modes as desired. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized Hasegawa's output modes and mode selection in order to enable a user to easily select one of a high resolution or high dynamic range mode as desired. Examiner notes that in combining this teaching with Nayar's invention in the high dynamic range mode the image signals would be passed through the claimed processing section and then on to the implicit additional section and in the high resolution mode the image signals would simply be passed to the implicit additional section in order to maintain a high resolution output.

In regards to claim 2 Nayar discloses the image capture system as claimed in claim 1 wherein the processing section expands the response of the non-standard photosites to decreased light exposures by utilizing the image signals from neighboring standard photosites (e.g., see Fig. 6, paragraph 4 of section 7 on page 476).

In regards to claim 7 Nayar does not explicitly disclose that the non-standard photosites have a response that is slower by at least one stop compared to the standard photosites. Examiner notes that it would have been obvious to one of ordinary skill in the art at the time of the invention to have defined the differences in photosite response in terms of a number of "stops" since such a definition is well known in the photography art to describe exposure values. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a response of the non-standard (slower response) photosites of Nayar to be slower by at least one stop compared to the standard photosites in order to generate a difference

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in exposure response between the standard and non-standard photosites and thus extend the dynamic range of the pixel as taught by Nayar.

In regards to claim 8 not that Maya does not disclose any color filters, therefore the photosites are monochromatic.

In regards to claim 9 Examiner notes that it is extremely well known in the art to provide a color filter so as to produce a color image. Official notice is taken. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have added a color filter to Nayar's invention in order to generate a color image. Examiner further notes that it is extremely well known to use a Bayer color filter so as to generate more data for the green color plane. Official notice is taken. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have used a Bayer color filter in order to generate more data for the green color plane. Examiner notes that in applying the Bayer color filter to Nayar's invention the standard photosite element e3 and the non-standard photosite element e1 would both be green.

In regards to claims 23 and 24 see Examiners notes on the rejections of claims 1 and 2.

In regards to claim 39 see Examiners notes on the rejection of claim 9. Note that e1 is the nearest photosite with the same color to e3 wherein photosites e1 and e3 do not have the same response.

In regards to claim 49 note the official notices taken in regards to the rejection of claim 9. Examiner notes that it is extremely well known to provide a color filter array interpolator in order to provide full resolution in each of the color planes of the color filter. Official notice is taken. Therefore it would have been obvious to one of ordinary skill in the art at the time of the



invention to have provided a color filter array interpolator in order to provide full resolution in each of the color planes of the color filter.

In regards to claim 50 while it is not explicitly disclosed that the mode selection of Hasegawa is through user input it is clear in the description that it is preformed through user input. For example, in the description of the related art Hasegawa discloses that previously a plurality of separate camera's would have to be set up and chosen according to a use, wherein this would all be done by a user. As such, in providing the selectable modes it is clear in the description that the selection would also be done by a user.

In regards to claim 52 Examiner notes that Nayar discloses that the controller is permanently set in the expanding mode.

In regards to claim 53 see Examiners notes on the rejections of claims 23 and 50.

In regards to claim 57 see Examiners notes on the rejection of claims 1 and 9.

Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over ("High Dynamic Range Imaging: Spatially Varying Pixel Exposures" by Shree K. Nayar and Tomoo Mitsunaga. Proceedings IEEE Conference on Computer Vision and Pattern Recognition, Vol. I, pp. 472-479).

In regards to claim 40 see Examiner notes on the rejection of claim 1. Examiner notes that it is extremely well known in the art to provide a color filter so as to produce a color image. Official notice is taken. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have added a color filter to Nayar's invention in order to generate

a color image. Note that the two nearest neighbors of a given non-standard photosite element e2 are two standard photosites e3 and two non-standard photosites e1 as shown in Fig. 1.

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over ("High Dynamic Range Imaging: Spatially Varying Pixel Exposures" by Shree K. Nayar and Tomoo Mitsunaga. Proceedings IEEE Conference on Computer Vision and Pattern Recognition, Vol. I, pp. 472-479) in view of (USPN 5,714,753 to Park).

In regards to claim 35 Examiner notes that Nayar discloses using different microlenses on the array but does not explicitly disclose that standard photosites would have microlenses and non-standard photosites would not. Park discloses the use of a microlens to focus light onto photodiode 22 in order to increase the response of photodiode 22 as compared to photodiode 24 (column 2, lines 54-57). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have not used a microlens on non-standard photosite e0 depicted in Fig. 1 as taught by Park and to have used different microlenses for photosites e1-e3 as suggested by Nayar in order to enable the different detection sensitivities at different locations with microlenses as suggested by Nayar and explicitly taught by Park with the standard photosite not including a microlens.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian C. Genco who can be reached by phone at 703-305-7881 or

by fax at 703-746-8325. The examiner can normally be reached on Monday thru Friday 8:30am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Christensen can be reached on 703-308-9644. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is 703-308-4357.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian C Genco  
Examiner  
Art Unit 2615

June 2, 2004



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